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# PACKET RADIO MAGAZINE

Dedicated to the Advancement of Packet Radio

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and

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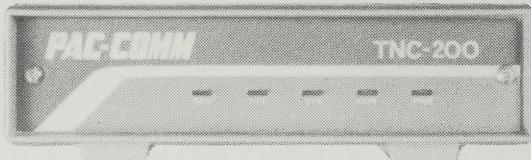
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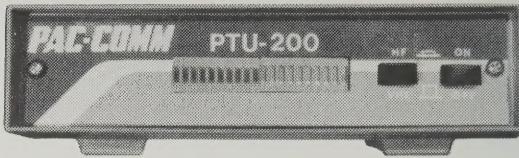
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- MAPRC - Mid-Atlantic Packet Radio Council
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- PPRS - Pacific Packet Radio Society
- RMPRA - Rocky Mountain Packet Radio Association
- UPRA - Utah Packet Radio Association

Articles and photographs are solicited dealing with any aspect of digital communications. Both technical and operational topics are desired including new product announcements and equipment reviews.

## **The Peripatetic Packeteer**

KI7L

The peripatetic packeteer strikes again! Actually the hiatus was in part caused by my weakness for MR-2s. Efforts to reduce the radar cross-section of my wife's MR-2 infected me with an insatiable desire to own my own. In the final determination "He who dies with the most toys wins".

Well, off to Blue Mountain on the Utah/Colorado border in my new "arrest-me red" MR-2. The idea was to investigate Blue Mountain as a digipeater site for a link to Colorado and beyond from Salt Lake. The trip over to the Uinta Basin was generally uneventful; no gendarmes anywhere to be seen.

Near Asphalt Ridge I gave Gary, NB7B, a call on the Blue Mountain voice repeater. No response. Another call and Jay, KA7BPB, came back and indicated he hadn't heard Gary on today. The Uinta Basin group was aware of the purpose of my visit and were very helpful in getting Gary on the radio via the landline. I needed to obtain a short length of coax, to replace the one I had left at home, in order to connect the amplifier to the HT. Gary had lent all of his spares to the club for field day activities which were about to get under way. The local Radio Shack in Roosevelt had the cable I needed and I was off to Vernal.

We transferred the portable packet gear to Gary's pickup and headed towards Blue. The shortest route took us across Dinosaur National Monument and up a dirt road on the west side of Blue. About three quarters of the way up the truck boiled over but ever prepared NB7B had 5 gallons of water aboard. While waiting for the engine to cool off, the Snowbird digi, KD7YK-2, was heard on the HT. Blue Mountain is a mesa with numerous repeaters on the top and the site is supplied with AC power. The almost 9000 foot height has a good shot to the 11000 foot Snowbird machine, making it easily over the intervening ranges.

Once at the top we set up the HT, TNC-2, the M-100, and fed the output into a homemade three element delta loop Yagi. Signals were decoded and a connect was made. The Snowbird digi is about 135 miles away from Blue as the packets fly and the 5 W output of the HT was just a bit thin for solid connects so we had to add the TE Systems amp to the station to ensure a solid connect. Rattle, rattle! Hmm, seems the screw from the final tuning capacitor had worked itself loose on the road up; what to do? Figuring that if it worked loose easily, the correct position would be that with just a little tension; the capacitor was readjusted. (Back home this proved to be a very acceptable position but the drive tuning needed tweaking from factory adjustment.) 75 W erp appears to be the minimum needed for solid connects to Snowbird and points east.

*Continued on page 20 >>*

## Homebrew Packet

Howard Goldstein, N2WX  
681 Cardinal St SE  
Palm Bay, FL 32909

NEW SOFTWARE -- The next version of network switch software is in the works. Targeted at the TAPR TNC 2 / clones, NNC, and Xerox 820-FAD it will offer a cleaned up PAD interface (looking much like X.28) and interswitch level 3 calls that get routed (!)

The stable modules so far are the: n port hdlc driver, operating system, multiple link level 2 version 2.0 handler. This code doesn't support older, pre version 2.0 simply because it's so messy to implement. Also meaningful remote control options are replacing the friendly local interface.

For development work, trusty CP/M 3, S-100 and a Software Toolworks C/80 C compiler (cheap, cumbersome, yet ROMable code) are the tools of convenience. And economy, as this is the Homebrewed Packet.

GATOR 2 - As of this writing, there are six known GATOR 2 switches on two meters, in Florida alone - located in Daytona Beach, Jacksonville, Melbourne, Ocala, Stuart, and Tampa. Elsewhere there are known switches in Michigan, New Jersey, New York, and Ontario.

Most reports have been very positive. However there has been one nasty problem reported concerning the user PAD interface and the way it reacts with bulletin board systems. BBS ops should be on the lookout for a "deadly embrace" where the PAD and BBS sit for a very long time arguing over whose error message is REALLY the invalid command.

A good interim solution is for the BBS op to exclude all but the local switch. This seems to help in all but the most stubborn cases.

Also I'd be very interested in hearing from others on a problem where the 820-FAD combination will stay keyed down for way too long - especially if you've solved the problem. It seems to be a hardware, perhaps mechanical problem.

In any event it would be nice to know who is running what release of the switch code. Please drop me a postcard or email and let me know that and what hardware it's on. If I hear from you I can make sure you hear about the next version when it's ready.

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and *Command Post* \$9.95.



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62708

## Packet on the ATARI ST

Chuck Harrington, WA4GPF

If you are a satisfied Commodore 64 user, you owe a special thanks to a man named Jack Tramiel, who was the head of Commodore at the time that both the VIC-20 and C-64 computers were developed. When much of the Commodore staff wanted to develop costly business computers, Jack insisted on building "Computers for the masses, not for the classes". Jack Tramiel made loyal Commodore users of many of us, by giving an exceptional computer value. The reasonable cost of the keyboard and disk drive, along with the large assortment of software and accessories, makes the Commodore 64 a good buy; and there are more than 5 million C-64s out there at present!

You may be asking, "What does all this have to do with Atari?" Well, at the time, when the C-64 was enjoying its greatest success, Jack Tramiel left Commodore, and purchased the nearly bankrupt Atari Corporation. Working with many of the same people who had developed the Commodore 64, the Atari 520 ST was designed and made available for sale within a year. The 520 ST and its marketing strategy, bear a striking resemblance to that of the Commodore 64. Like the 64, it is a keyboard computer, with separate disk drives, and power packs. You may connect the keyboard to an Atari video monitor, or to your own TV set. The 520 ST was originally sold only thru computer stores, but is now being mass marketed, just as the C-64 was; in fact, you can find it now in the stores of a major toy store chain, right next to the Commodore 128 computers.

The Atari ST is such an incredible value, that when you buy it and take it home, you may find yourself feeling guilty that you paid so little. The 520 ST features a Motorola 32/16 bit 68000 CPU, running at a full 8 Mhz. The computer operating system, known as TOS (Tramiel operating system), is contained in 196K bytes of ROM. You also have 512K bytes of RAM (memory) with about 360K bytes available to the user after the standard desk accessories are loaded. Many of the special interfaces you had to buy for your C-64, are standard on the ST. You have a standard RS-232 serial interface (for connecting to your TNC), and a parallel printer port. A "MIDI" port, which is designed as an interface to musical instruments, is actually a 32,000 baud rate serial interface that may have uses other than music! The ST features a 105 key keyboard, which includes a mouse and 10 function keys. The video display has 24 lines of 80 characters in four of 512 different colors, or 40 character lines in 16 colors. I might add, that both the color and black & white monitors, have the sharpest, most eye pleasing displays that I have ever seen in a computer. The Disk drives are the 3 1/2 inch type; single sided with 380k bytes storage capacity, or double sided with 760k. The computer also has a hard disk port, that features one of the fastest data transfer rates in the business, about 1 million bytes per second; hard disks are currently available from 10 megabytes to 60 megabytes.

Continued on page 6 >>

## **WORLI Work-alike for the C-64**

Joe Burnham, WD4KAV

Well, almost! Bob Bruninga, WB4APR, has written a BASIC BBS program that performs almost all the functions of the more "famous" software that runs on the hard to find Xerox 820.

The most important differences are these:

1. The WORLI system is a true BBS, storing nearly all of its data on disk. It is a file oriented system, with free disk space being the only limit on the length of messages or files that can be uploaded or downloaded. The WB4APR software should be thought of as a MESSAGE system, not a file system. All data is stored in RAM (about 19K available at initial power-up) and dumped to cassette once every 24 hours for back up.

2. WORLI's program is capable of forwarding to other RLI systems that are one or more digipeaters away. Users more than one digipeater away can access a WORLI BBS, and use it without difficulty if permitted by the SYSOP (and assuming they're not on .01!!!)

WB4APR's program works most reliably when accessed direct or through just one digipeater. It is difficult to modify the program to forward messages to a system that is far away, and distant users will get "timed out" more often than not. In addition, because of the peculiarities of the C-64, Bob's software has NO flow control when receiving or sending messages. As a result, stations that access the system from any distance are likely to receive garbled messages from the BBS.

Those are the major differences between the two systems. At this point you might dismiss WB4APR's effort as a well intentioned failure, but this would be unfair.

Bob has always been an advocate of a "cellular" approach to Packet Radio. What this means is that each town or other geographical area, no matter how remote, has its own limited coverage BBS. The hams living in these locations rely on these "miniature" systems to forward their messages from one LAN to the next, and so on down the line till it reaches its destination, or gets passed on to a WORLI system in a major city.

WB4APR's program fills a need in large LANs too. Here it is ideal as a club or special interest system operating on a separate frequency distinct from the main "trunk" and BBS frequencies. So, considering all the above qualifications and cautions... what are the strong points of the software? It has:

1. "Heard" and "connected" logs.
2. Commands for sending, reading, killing messages very similar to WORLI.
3. A LIMITED file storage ability (4K), with the SYSOP only allowed to upload to it.

4. Automatic formatting of the message text that the SYSOP enters at the keyboard.

5. Provision for remote SYSOP control.

6. Compatability with WORLI (and workalike) BBSs for automatic reception and forwarding of messages.

Finally, while not normally thought of as a "feature," the program is written entirely in BASIC, so you can modify it to your heart's content. Bob provides ample documentation with the BBS allowing more experienced programmer to delve deeper into its parameters and functions.

Though it's not commercial quality, and too limited in memory to be a major BBS system, I find the program more than adequate as a personal message system. Perhaps you will too.

If you would like a copy, send a cassette and postage to Bob Bruninga at the address below. A copy on a disk is available for five dollars. You supply the FORMATTED disk!

Bob Bruninga  
59 Southgate Ave.  
Annapolis, Md  
21401

- PRM -

## **SOUTHNET NOTICE**

July 13, 1986

Dear Gwyn,

I would appreciate it if you will include this information in the next issue of Packet Radio Magazine.

At the November 1985 meeting of SOUTHNET in Atlanta, an HF SSB Radio net was established for SOUTHNET information exchange purposes. Since that time this net has been meeting weekly **each Sunday at 2:30 PM EST or EDT** on 7190 kHz. Net control station is W4FX.

Since the above frequency is in a sub-band which excludes general class operators, it has been decided to **change the net frequency to 7260 + or - QRM effective September 1, 1986**. This will provide the opportunity for General through Extra class operators to check in. We will continue to meet on the same day and time as above. This net can serve an important function in providing a real time forum and information exchange for packet radio. It is urged that all those interested in packet radio in the Southeast check into this net at every opportunity.

Best regards,  
Rip, W4FX

- PRM -

# Connectionless Emergency Traffic System

Bob Bruninga, WB4APR  
59 Southgate Ave  
Annapolis, MD 21401

To meet the needs of realtime message delivery under emergency or exercise conditions with a large number of packet stations, a connectionless protocol is being developed to run as an application layer on standard AX.25 TNCs running in the monitor mode. The protocol evolved from the Simulated Emergency Test (SET) in November 85 where a large number of short messages (patient transport notifications PTN's) needed to be delivered from a few central locations in a disaster area to a large number of medical facilities in a short period of time.

The protocol, which could be implemented on any computer is being developed on the C-64. For familiarity, the C-64 will appear to the local operator as a conventional BBS using standard BBS commands. It will collect and ACK all incoming messages lines including bulletins in the background and continually update the messages. Using BBS commands, the local operator can selectively LIST, READ, Display or PRINT the traffic.

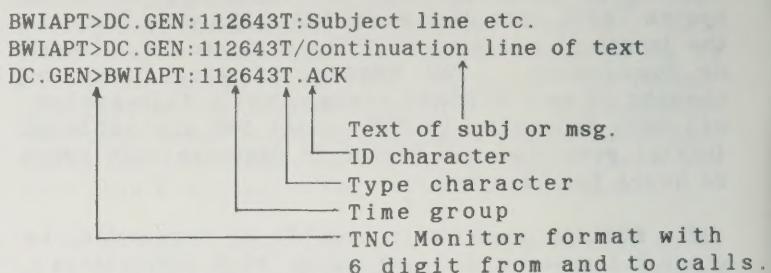
Outgoing traffic is prepared using the SEND command. The lines of text are periodically transmitted in the TNC UNPROTOCOL mode until an acknowledgement is received. Each message accepts ACKS not only from the destination station, but also from one other station such as a command center or logging station. The protocol adds a 6 digit serial number and two byte status overhead to each packet to maintain the system of positive acknowledgements.

The system implemented on the C-64 can maintain about 300 message lines of text. After messages are printed or delivered, they may be individually killed or purged or saved to tape or disk. Although BBS commands are used for local operator familiarity in managing his own messages, any further similarity to a remote user type of BBS function does not exist. The software will be field tested this July during the Washington DC SET and be available from AMRAD sometime after that.

## System Setup

In general, the system is not dependent on precise knowledge of all the stations participating. No master list has to be updated and maintained as stations come and go. For outgoing messages, a default path (direct or digipeater) is assumed. For stations not accessible over that path, a list of up to 10 specific callsigns may be given special routing options. Incoming traffic destined for other stations can be receipted/ acknowledged by building a guard list of up to 10 additional callsigns for which this station will guard. These two lists, the GUARD and OPTIONAL ROUTING tables may be called up and modified at any time. Each station can also designate an optional station to be a COPY TO addressee for all messages that he originates. This additional station must also acknowledge the packet before the sending station will stop transmitting it. This COPY TO feature is expensive in terms of throughput and congestion and will be subject to further study.

Since most emergency traffic should be time stamped anyway, a six digit hour, minute and second time field is used as the unique packet identifier for the purposes of sequential delivery and acknowledgement. Since a TNC cannot send a full text line packet in under a second at 1200 baud anyway, this is not a limitation. System clocks do not need to be synchronized except for normal good operating practice. The format for the connectionless protocol is as follows.



Two additional bytes are added to the six digit time stamp to complete the overhead required under this protocol. One byte indicates the type of message. This is an optional character not a function of system software that is assigned by the originator of a message to make selective listing of the various message types possible. The second byte identifies the packet as either a subject line or continuation line. A colon identifies it as a subject and a slash identifies it as a continuation of the message. All continuation lines are sequentially assigned seconds digits starting with the time of the associated subject line. This limits message lengths to 40 lines. (59 seconds worst case for the subject line plus 40 lines = 99)

## Receive Processing

The system software is constantly polling the packet channel and the keyboard. Every packet is displayed in a "heard" window at the top of the screen to give the operator a sensitivity to what is happening on the channel. All packets with a TO address matching a call in the GUARD list are acknowledged and then merged into the message file in time group order. The operator may then use any number of BBS type commands to LIST, SORT, READ, PRINT and KILL messages as appropriate.

112715 S:56 B:5 T:16 STATUS			
BWIAPT>DC.GEN:112643T:1145/A-AACO#1547			
SERIAL	TO	FROM	SUBJECT
112643T	DC.GEN	BWIAPT	1145/A-AACO#1547
112236T	DC.GEN	BWIAPT	1136/h-PGCOH#1342
112023	DC.GEN	ANDREW	WHOS GOT THE VAN?
111818B	BULLET	ANDREW	SISTEN ON 146.73
111810T	DC.GEN	ANDREW	1150/A-PGCOFD1221
105539	DC.GEN	BWIAPT	HOW MANY VEICLES?

FIGURE 1. Shows a typical screen display during a LIST command showing the status line at the top followed by a heard window and then the application title and in this case, the listing of the last 6 entries was obtained by using the LL 6 command.

112715	S:58	B:5	T:6	STATUS
BWIAPT>DC.GEN:112643T:1145/A-AACO#1547				
SERIAL	TO	FROM	SUBJECT	
112643T	DC.GEN	BWIAPT	1145/A-AACO#1547	
1105/A01 BO3 COO DOO/				
A1 IS 2ND AND 3RD DEGREE BURNS B1 TO B3 ARE MINOR HAVE THIS AMBULANCE GO BACK TO ANDREW NOT TO BWI. HE HAS TO REPLACE THE OTHER UNIT INVOLVED IN THE ACCIDENT.				

FIGURE 2. This screen is the result of a READ command. The message read was a PTN which had some amplifying comments. Only a 14 line screen is shown here, but the C-64 does display a 24 line screen. For longer messages, the display waits for the operator to press any key to continue.

112715	S:56	B:5	T:16	STATUS
BWIAPT>DC.GEN:112643T:1145/A-AACO#1547				
SERIAL	TO	FROM	SUBJECT	
112643T	DC.GEN	BWIAPT	1145/A-AACO#1547	
112236T	DC.GEN	BWIAPT	1136/H-PGCCOH#1342	
112023T	DC.GEN	ANDREW	1132/A-BWIE#452	
111818T	MT.SNI	ANDREW	1145/A-MTHLY2345	
111810T	DC.GEN	ANDREW	1150/A-PGCOFD1221	
105539T	DC.GEN	BWIAPT	1210/B-GHND125431	

FIGURE 3. This screen is the result of a LT command which lists all the messages of type T. The format of the PTN is the ETA followed by the vehicle descriptor. Although truncated on the C-64 screen, the PTN subject line continues with the time of departure and the number of patients on board in each category. In this example, MT.SNI is also in the GUARD list.

#### Transmit Processing

Outgoing traffic is prepared using the standard BBS SEND command including the optional message type character. The "@" field is not used. The subject line is prompted and then any continuation of text. A single line message (preferred) is identified by terminating the subject line with a CTRL-Z instead of the usual carriage return. After a message is prepared, the operator is prompted for a routing path is other than the default and whether or not a COPY TO acknowledgment is desired. The software also supports a special formatted message type which is customized for the particular application. In this case, a special format is available for the preparation and display of Patient Transport Notifications (PTN's).

#### Manual Station

Non automated packet stations consisting of nothing more than a TNC and dumb Terminal may participate in the connectionless protocol if needed. These stations set their monitor mode to monitor only packets to their own station. As message lines or

PTN's come in, he types an ACK packet using the 8 digit serial number followed by the ACK characters. This will acknowledge receipt and cancel the packet from the sending stations buffer. He can manually transmit any message to another station simply by including the 8 byte protocol on the front of each typed line and watching for a return ACK. There is ample time for this manual process as the net cycle time is on the order of 10 to 20 seconds.

112715	S P E C I A L   F O R M A T	
BWIAPT>DC.GEN:112643T:1145/A-AACO#1547		
PATIENT	TRANSPORT	NOTIFICATION
FROM: BWIAPT		TO: DC.GEN
DEPART: 1047		ETA: 1125
VEHICLE: A-PGCO#1345		
PATIENTS: A:01 B:04 C:00 D:00		
REMARKS: A1 is 2nd and 3rd degree burns B1 to B4 are minor lacerations. Have this vehicle return to Andrew, not BWI to replace the other AACO unit.		

FIGURE 4. An optional special formatted screen is available for entry and display of PTN's

#### System Timing

The timing estimates for the system are based on the following brief analysis. Assume 1000 patients arrive 50 per plane load to triage. From triage, 15 at a time are loaded into 3 ambulances in 6 minutes or so generating one PTN about every 2 minutes for about 20 minutes per plane. If two planes overlap, the peak loading would be one PTN every minute. The time to enter a PTN takes about 20 seconds average leaving a 3 to 1 margin. Comparing the 60 characters per PTN transmitted every 20 seconds results in a 5% channel loading which is favorable to the predicted 18% channel capacity of an ALOHA network. In many emergencies, the bulk of the outgoing traffic originates in one or a few stations. To optimize the timing, the software asks if this station is such a source station, and if so, how many other source stations are expected.

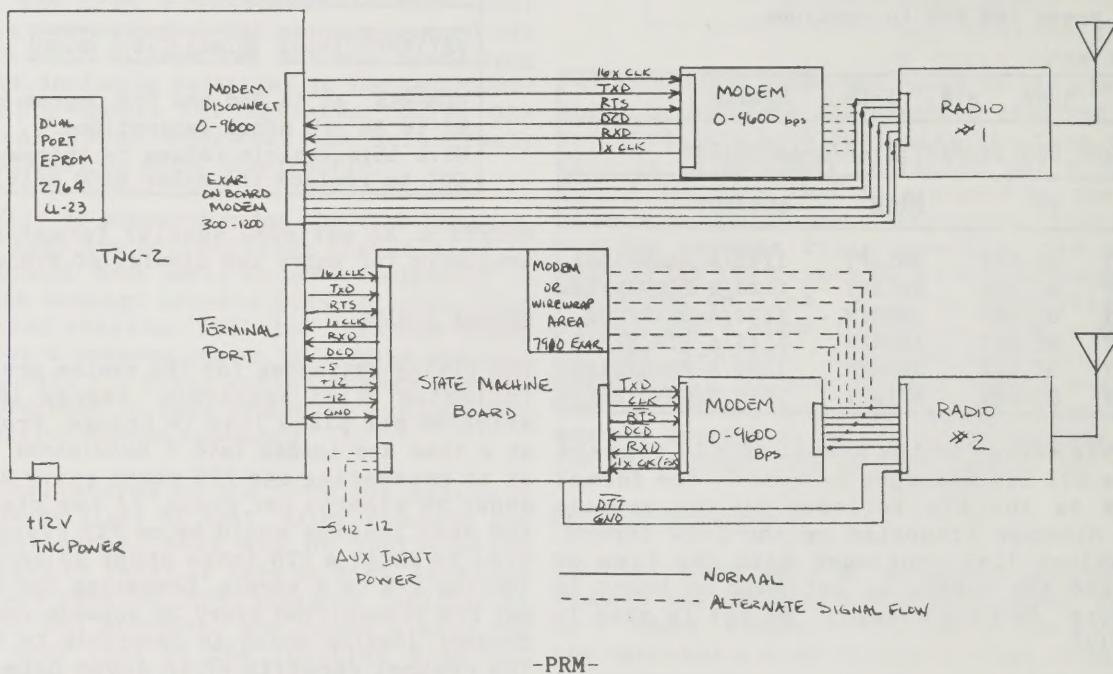
The time to transfer a message from the C-64 through the buffers, through the TNC, through the digipeater, into the receiving TNC, through the buffers, and into the processing of the receiving computer is not insignificant. Also additional time is required to receive a COPY TO acknowledgment. For these reasons, a TALK, TALK, LISTEN format is used. The second message is transmitted during the receive processing time of the first. With only one major source station and this type of pipelining, 1 message every 10 seconds is possible. This falls off to 1 message every 20 seconds with more source stations and provision for other casual messages through the net. This 20 seconds compares favorably with the estimated 20 second maximum loading suggested above. The software currently contains all major modules and a significant simulation package to allow study and analysis of operator interaction with the system.

## TNC-2 Dual Port Digipeater

Jack Davis, WA4EJR  
25341 Orellano Way  
Laguna Hills, CA. 92653

The "state project" is a group effort by several hams in the Los Angeles/San Diego area. It was developed by Mike Brock, WB6HHV, Tom King, KA6SOX, and Orv Beach, WB6WEY. My involvement is more administrative than technical. That leaves the guys with the smarts to do more development work. It was designed, built, and tested in breadboard form and then printed circuit boards were made. It was shown working at the TAPR meeting in Tuscon in February.

At this time we are offering a printed circuit board, custom PAL and one hard to find IC complete with documentation for \$25.00. The modified KE3Z dual port code is available for and additional \$5.00. On special request we will customize a rom (2764) for \$5.00. Everything is available for immediate delivery. The block diagram in figure 1 will give an idea what is involved in this project. Look it over and decide if this will satisfy your networking project requirements. Some trace cuts and jumpers are required to both the TNC and the state board. This will be corrected in the next revision. If I can be of further service please let me know. I check into the Compuserve Hamnet sig several times a week and my I.D. is 72356,441. If you write, a SASE would be appreciated.



### PACKET on the ATARI ST Continued

The computer comes with the GEM operating system, which is part of TOS. GEM is a graphics oriented operating system, that might have made the first computer experiences of many of us a lot more pleasant; GEM must be seen to be appreciated! GEM uses pictures of objects, called ICONS, which are moved around the screen with the mouse in order to run programs, copy and delete files, and do many of the other tasks that used to require the precise typing of commands from a keyboard. As part of the software, you also receive some DESK ACCESSORIES, which include a VT-52 terminal emulator, which is a dumb terminal program that you may use to get your ST working on packet. Other accessories allow the reconfiguration of the serial port, printer configuration, changing screen colors and other user features. You also receive several programs on disk, with your 520 ST; a very nice word processor called FIRST WORD, an interesting drawing program called NEOCHROME, a game called MEGAROIDS, and two programming languages, BASIC and LOGO.

*More >>>*

Now that we have met the ST, lets talk about PACK-ET-TERM 3.0. I have written this packet specific, ST terminal program to introduce the Atari ST computer to the packet radio user community. I am happy to announce that BETA versions of this software are now available! PACK-ET-TERM features triple split screen operation, text file transfer capabilities, time stamps, connect messages, connect status and current time display, several unique printer options, and more. PACK-ET-TERM will work with YOUR TNC, and is free! You may get your copy of PACK-ET-TERM from the FADCA software library. If you are the impatient type, and have a telephone 300 baud or 1200 baud modem, you may call the McDonald Development BBS at (305) 886-1632 and download the file PACKET.TOS, which is the program, and PACKET.TXT which is the program documentation. You may also send a check for \$4.00 to me to cover the disk and shipping; I am good in the callbook.

Next month, more on the Atari ST and PACK-ET-TERM, until then, thanks for connecting.

## **Computer Networks**

### **-- Part II**

Rollins Turner

Packet radio networks differ from all previous forms of radio communication by making use of computers to control communication. Packet radio nets are, in fact, computer networks. An article in the May 1986 issue of Packet Radio Magazine began in overview of the basic concepts of computer networks. In this article we conclude that overview with a look at the higher layers of a typical computer network architecture.

We saw in Part I that computer networks are usually designed as a number of layers of software and hardware. Each layer uses services of the layer below (if any) and provides a set of services to the layer above. The services are increasingly complex and sophisticated as we advance up the layers. The first, and most basic, layer is the physical communications layer. The service provided by this layer is the transmission of information between geographically separate points. The second layer is called the data link layer. Its major function is to handle errors introduced by noise and interference in physical transmission. It also adds some structure to the raw data stream provided by the physical level. These first two layers were examined in some detail in Part I.

The third layer is called the network layer. The network layer is necessary only when not all stations can communicate directly with each other. Its major function is to forward packets on behalf of stations that cannot communicate directly with their destinations. The fourth layer is called the transport layer. While the first three layers operate at each hop along a packet's path, transport operates only at the source and destination. Transport provides a reliable, end to end communications service for network users. It permits multiple simultaneous conversations to be in progress at a single network station without interfering with each other. And it provides for the orderly establishment and termination of these conversations. In this article we will look in more detail at the Network and Transport layers.

The Network layer is responsible for making a network truly a network. If every station could communicate directly with every other station the network layer would not be needed. In most cases of computer networks spread over a wide area, each station can communicate only with a few other stations. Typically the communication links are leased telephone circuits. For a network with more than a few nodes it would be too expensive to provide direct connections from each node to every other nodes. Networks based on VHF or UHF radio have the same limitation. Unless the stations are all within line of sight of each other, some stations cannot communicate directly with others. Fortunately, this is not a serious limitation. We can include software in each node to relay messages, or packets, from station to station. This is the function of the Network layer.

There are two major classes of Network Layers, called virtual circuit networks and datagram networks. A virtual circuit is a path through the network. A virtual circuit is similar to a physical circuit, except for time delay. A virtual circuit must be set up, much like a long distance phone call sets up a circuit through the telephone network. At each network node along the path, information is stored, indicating where to forward packets traveling on that virtual circuit. Packets received at an intermediate node are stored and forwarded as time permits. Packets of a given virtual circuit are always forwarded in the order that they were received. The data link layer ensures that they are delivered to the next node with no errors. Therefore a virtual circuit provides the appearance of a perfect end to end circuit. Packets are delivered to the destination node exactly as sent by the source--in order, with no errors, and with nothing missing or duplicated.

In a datagram oriented network layer, each packet is independently forwarded through the network. Each packet carries a complete destination address. (Note that with virtual circuits a packet only has to carry a circuit ID.) At each node the network layer software makes a decision about how to forward the packet. This is done by a set of rules that make up the routing algorithm. In most networks, the decision of how to forward packets addressed to a given destination is subject to change over time. For example a new node may join the network, providing a shorter path to some destination. Because each packet is forwarded independently, packets may not arrive at the destination in the same order that they were originally transmitted. A datagram oriented network layer typically provides only "best effort" delivery: a packet may not be delivered at all.

The usual question at this point is "What good is a network that may scramble packets, or possibly not deliver them at all?" To understand why such a network might be useful, you have to recall that users and user programs do not directly utilize the network layer: they utilize the transport layer. It is up to the transport layer to correct the deficiencies of the network layer. Rather than develop a reliable, sequenced virtual circuit oriented network layer, it might be easier to implement a relatively simple datagram oriented network layer and fix up the problems in the transport layer. This is, in fact, what is done in several widely used computer networks.

The transport layer is the lowest layer that operates only at the source and destination. At intermediate nodes, only the lower three layers of network software are involved. The transport layer provides the user's interface to the services of the network. Its overall responsibility is to bridge the gap between what the network layer provides and what the user needs. The service provided to users is typically identical to the function of a virtual circuit service. If the network layer provides virtual circuits, transport has very little to do. If the network layer provides a datagram service, transport has to do a lot more.

*More >>*

A function which is almost always provided by transport is multiplexing. We want several programs at Node A to be able to communicate independently with several programs at Node B. To do this we need multiple virtual circuits from A to B. These are often called "connections" or "logical links" at the transport level. Transport provides its user programs the ability to request a connection to a program on any other node in the network. In requesting the connection, the program typically has to specify only the identification of the node and program to which it wants the connection. It does not have to be concerned with the path that packets will take, and it does not have to be concerned with what other programs are doing at the same time.

Once a connection is established, either program can send messages to the other via the connection. Transport guarantees that these messages will be delivered exactly as sent. (If it is unable to do this, transport will signal an error to the user program.) In many cases, programs may want to exchange messages that are larger than the network layer can handle in a single chunk. In this case, transport will break the message up into multiple "fragments" which it sends through the network as separate packets. At the destination, the transport software puts the packets back together, and delivers a complete message to the receiving program, exactly as the message was sent by the sending program. This function is called "fragmentation and reassembly."

If the network layer provides a datagram service, transport must ensure that packets arriving for a given connection are delivered exactly as sent, with nothing missing and nothing duplicated. To do this, it adds a sequence number to each packet. The sequence numbers are sequential for each connection. Thus if a packet arrives out of order, or if a packet is lost by the network layer, transport can know that this has happened. When the expected packet arrives, the destination transport software sends an acknowledgement message back to the sender. This is an end to end acknowledgement, not to be confused with the acknowledgement sent over a single hop at the data link level. If the sending transport does not receive the end to end acknowledgement within a reasonable amount of time, it retransmits the message. Unfortunately, the acknowledgement could be lost by the network just as easily as the original, resulting in transmission and receipt of a duplicate message. Transport must detect this, by checking the sequence number, and throw away any duplicates. The result of all this effort by transport is that user programs obtain a service identical to that of a virtual circuit, even though the network provides only a datagram service. If the network provides a virtual circuit service, transport's job is much easier.

This completes a quick tour of the first four layers. In discussions of standard computer network layering, you will hear three higher levels mentioned: session, presentation, and application. While these are defined in the standard network structure model, implementations do not agree very well on what they should do. The application layer refers to whatever the user might choose to add on top of the basic network service. As such, it is not really a part of the network at all. Presentation

and session have different interpretations in different networks, and in many cases one or the other or both are not included. On the other hand, most existing networks agree fairly well with the descriptions we have seen for the first four layers.

[Rollins Turner is the principal consultant of System Performance Analysis, Inc., in Tampa. For the past three years he taught graduate courses in Computer Networks, Computer Architecture, and Modeling Computer System Performance at the University of South Florida. From 1970 through 1983 he was on the staff of Digital Equipment Corporation. He holds a PhD in Computer Engineering from the University of Massachusetts, Amherst.]

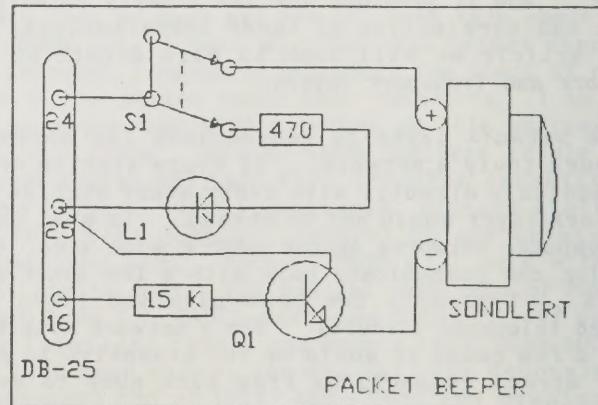
- PRM -  
**Packet Beeper  
for TNC-1 Clones**

Reprinted from "Packet Racket"

How many times have you been in the shack cleaning up (ha) and because of your lack of attention to the terminal screen you miss your friend's connect. All you see is the connect message and then the disconnect message because you didn't answer. The friend doesn't use control-G (bell) because he doesn't want to disturb others from their "cleaning". The following is a handy connect status indicator for TNC-1 and clones that will prevent you from missing those important connect requests from your friend. The "Packet Beeper" sports an audible alarm to alert you when someone connects to your station.

Circuit Description

The DB-25 connector plugs into the accessory (parallel port) connector on the back of your TNC. Pin 16 provides a "connect status" voltage when your TNC is in the connect state. When pin 16 goes high, it triggers the sonalert telling you that someone has connected to your station. To disable the alarm, set S1 to the off position removing +5 volts from the sonalert. In this position, the optional LED L1 will be lit alerting you to the fact that the connect alarm is disabled. A 2N2222 transistor can also be used in place of Q1.



PARTS LIST

- 1 DB-25 connector
- 1 L1 LED
- 1 S1 DPDT switch
- 1 Q1 2N3904 NPN or equivalent

-PRM-

## Bouncing Packets Off the Moon and Other Topics of Lunacy

TOM CLARK, W3IWI/KL7  
July 9, 1986

As some of you may know, I had the opportunity to attempt bouncing some packets off the moon during the recent W3IWI/KL7RA 432 MHz EME outing using the 26M (85') diameter dish at Gilmore Creek, near Fairbanks, AK. Previously I had tried EME packets using the 43M (140') dish at Greenbank, WV and the 26M Alaskan dish; both earlier attempts were a total wipeout at 1200 baud due to the severe multipath conditions that arise because the moon is a 'rough' scattering surface.

This year I decided to try the new AEA PM-1 HF packet modem with 200 and 600 Hz shift FSK; the PM-1 employs separate filters and square-law detectors for the high and low FSK tones and hence is close to being an optimum detector for paths with lots of fading. This operated with a stock TAPR TNC2.

The 26M dish was measured to have 38 dBi gain. Due to mechanical limits, we were only able to use a QRP (by EME standards) xmtr -- about 140 watts output from a solid-state power amplifier (Mirage D1010N) located at the dish's prime-focus feed-point. This therefore gave us about 700 kW EIRP squirted at the moon. The receiver used a GaAsFET preamp (at the feed) driving a converter and a TS830. The transmitter exciter was an FT726. The feed consisted of crossed-dipoles a quarter-wave above a ground plane for selectable linear polarization.

The round-trip travel time to the moon is about 2.2 seconds. We did the EME packet tests at a time when the doppler shift was small so that our receiver copied the out-going packet and then its return after reflection from the moon. The following are a few of the time-stamped beacons showing both the 'direct' and reflected signals (note the 2 or 3 second difference in the time stamps):

W3IWI>CQ [06/29/86 13:02:26]:W3IWI/KL7 test  
W3IWI>CQ [06/29/86 13:02:28]:W3IWI/KL7 test

W3IWI>MOON[06/29/86 15:19:46]:W3IWI/KL7 EME Packet Test  
W3IWI>MOON [06/29/86 15:19:49]:W3IWI/KL7 EME Packet Test

W3IWI>MOON[06/29/86 15:21:16]:W3IWI/KL7 EME Packet Test  
W3IWI>MOON [06/29/86 15:21:18]:W3IWI/KL7 EME Packet Test  
W3IWI>MOON[06/29/86 15:22:16]:W3IWI/KL7 EME Packet Test  
W3IWI>MOON [06/29/86 15:22:19]:W3IWI/KL7 EME Packet Test

I found that at 200 Hz shift, the incoherent fading still rendered most packets unreadable. This was quite apparent from just looking at the PM-1's LED tuning indicator. I also tried the 600 Hz shift mode on the PM-1 and was totally unsuccessful.

We had hoped to make 2-way packet QSO's during this EME outing. The team of XE1XA/XE1TU in Mexico City and VE7BBG in Vancouver were QRV but signals were too weak and fluttery to attempt a packet QSO.

Our 432 MHz operations spanned three days -- 28, 29 and 30 June. During that period we managed 29 QSO's with 19 stations. Of these 9 were stations we had not worked during previous W3IWI/KL7RA operations. We were very disappointed in the overall lack of activity. Only one European (OK1KIR) was on the air and we heard nothing from South America, Asia or Oceania or Africa. This lack of activity [which resulted in a lack of enthusiasm on our part to be masochists just to meet a 3 AM local moonrise, only to hear our own echos very loud and have nobody to work!], coupled with other station activities, caused us to reduce our planned operation window and terminate on the 30th of June (instead of going thru July 4th as we had originally planned).

The 19 stations we worked during the June 1986 session follow, where the \* denotes stations not previously worked by either W3IWI/KL7 or KL7RA, and ! indicates a successful 2-way SSB QSO. In addition weak signals were detected from W5NZX.

N9AB !K5JL WOHHE !\*KD6R !\*VE7BBG !\*W6XJ W1ZX \*WA5ETV W1JR \*XE1XA \*XE1TU \*WBOYSG N7ART OK1KIR K1RQG \*AD1C WORAP \*N4EL W8IDU

We also experimented using a 256 channel FFT spectrum analyzer (HP 3582A) monitoring either a 10 or 25 kHz chunk of spectrum and found that it would spot a weak station before we would acquire it by "earball" with the narrow CW filter on the TS830. Playing with this new 'toy' helped greatly to alleviate the boredom caused by having so few stations on the air. In the case of the weak signals from W5NZX which would have been marginal "M" copy, the FFT box was able to obtain a S/N of 10-15 dB with suitable time-averaging and we were able to measure his received frequency to an accuracy of < 10 Hz. It seems to me that it is now time to begin developing digital signal processing techniques for weak signal VHF/UHF/microwave work.

On July 9th, we had a bit of a thrill when we played SWL and ran a one-way sked with Paul Wilson, W4HHK on 2304 MHz EME. Paul was able to poke about 150 watts of S-band RF into his fabled dish and we had solid 569 copy for well over an hour interrupted only by Paul tripping the circuit breaker on his transmitter.

- PRM -

### FOR SALE

Packet Portable ZENITH ZP-150 battery powered laptop computer - with Microsoft Works ROM, 80 by 16 character LCD screen, extra 32K memory module (expandable to 416K), IBM upload/download software, extras \$625. Bob WA6ERB, 303-986-0189.

*Kantronics Introduces*

# **2400 BAUD PACKET\***

*Not Just For All Computers  
But For All TNC's Too!*

Packet channels are congested, and faster is better. So Kantronics has designed a 2400 baud PSK (phase shift keying) modem and included it in an all new KPC-2400. In addition, we are making this modem available in PC-board form to add to your TNC-1 or TNC-2, cables included! If you have a KPC-1 or KPC-2, we'll take it in trade for a new KPC-2400.

Since October 28, 1982, the rules have allowed for baud rates up to 19.6K. Of course, we've

## **WHY 2400 BAUD?**

all been operating at 1200 baud with Bell 202 (1200 baud) standard tones. However, the bandwidth of our radios is fully capable of running up to 2400 baud, giving us congestion relief. Our phase shift modem (PSK) takes advantage of the bandwidth available and the reasonable linearity of the audio channels, and it is designed with the V.26TER CCITT specification in mind. To add to your TNC or trade for a new KPC-2400, see facing page.



## **KPC-2400**

*All the Features of KPC-2  
Plus 2400 Baud*

### **KPC-2400 Features**

- AX.25 version 2 software
- Supports multiple connects
- All EPROM software is Kantronics written and U.S. copyrighted
- Advanced software HDLC, eliminating expensive chips
- In-house programmers/engineers
- In-house service representatives
- Periodic updates  
we keep you on the air

When we set out to design the KPC-2400™, we wanted it to be compatible with existing units, and it is. The KPC-2400 features both the KPC-2 modem for 300 baud HF and 1200 baud VHF work, and a new phase shift keying (PSK) modem for 2400 baud operation. All modes are software selectable with HBAUD command!

In addition, we've retained the RS-232/TTL jumper for easy direct interface to PC compatibles or the VIC/C-64 series. Hence, with the KPC-2400 you get HF, VHF, and 2400 baud packet with all computers that have a serial port, all in one!

The KPC-2400 of course, retains the version 2 software with multiple connects, and we've included an on-board memory diagnostic routine too.

*Suggested Retail \$329.00*

Speed up your local area network with the new *2400 TNC Modem*<sup>TM</sup>. The 2400 TNC Modem is a PC-board that mounts directly above your existing TNC PC-board. By adding the 2400 TNC Modem to TNC-1 or 2, you gain 2400 baud while retaining 1200 baud operation, switch selectable.

Two 2400 TNC Modems will be available—one for TNC-1's, and another for TNC-2's. If you purchased a TNC-1 or TNC-2, manufactured or kit version, the 2400 TNC Modem should be compatible. If you have a home brew case, the installation may require case modification.

The 2400 TNC Modem will be available in late June. You may order the 2400 TNC Modem through a Kantronics dealer or directly through Kantronics, using check, money order, Visa or Mastercard. *Suggested Retail \$149.00 (includes shipping)*.

## *Speed Up Your TNC-1 Or TNC-2*

**To**

**2400 BAUD\***

## *Trade In Your KPC-1 Or KPC-2 For a New KPC-2400*

That's right—Now you can trade in your Packet Communicator (KPC-1), or KPC-2, and for just \$149.00, you'll receive a NEW KPC-2400!

It's easy. All you have to do is fill out the *KPC-2400 EXCHANGE SCHEDULING FORM*, and mail it to Kantronics with check, money order, Visa or MC number. You'll be scheduled for exchange and notified by mail when to return your KPC-1 or KPC-2 to Kantronics. Once we receive your unit, a new KPC-2400 will be shipped directly to you.

You may also schedule your exchange by calling the Kantronics order desk and giving your Visa or MC number. Just call (913)842-7745 between 9-12, 1-4 (Central Standard

### **KPC-2400 EXCHANGE SCHEDULING FORM**

To schedule your KPC-2400 exchange, please fill out the information below and mail this form, including \$149.00 payment (shipping included) to **Kantronics, 1202 E. 23rd Street, Lawrence, KS 66046**. You will be notified by mail of your authorization number, and scheduled exchange date. **DO NOT RETURN YOUR UNIT WITH THIS FORM**. This form is being used to SCHEDULE returns.

When it is time to return your unit, please DO NOT SEND BACK ANY CONNECTORS, CABLES OR POWER SUPPLIES. Send back only the unit itself. Any cables, connectors, or power supplies received will not be returned. You will receive a new manual and a 9-pin connector with your new KPC-2400.

Name \_\_\_\_\_ Call Sign \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone(\_\_\_\_\_) \_\_\_\_\_ Date \_\_\_\_\_

Unit to be exchanged (check one)  KPC-1  KPC-2

Serial Number \_\_\_\_\_

Payment (check one)  Check or Money Order

VISA

Master Card

VISA or Master Card Number \_\_\_\_\_

Exp. Date \_\_\_\_\_

Any unit returned to the factory without payment, authorization number and prior scheduling will not receive priority placement.

Time) Monday-Friday, and we'll take it from there.

To guarantee a quick turn-around time, Kantronics is *scheduling ALL exchanges*, and assigning authorization numbers. Any unit returned to the factory without prior scheduling and authorization number will not be given priority placement.

 **Kantronics**

RF Data Communications Specialists

1202 E. 23 Street Lawrence, Kansas 66046 (913) 842-7745

\* KPC-2400 operates with a 2400 bits-per-second (BPS) data rate in the 2400 mode. The signal rate of 2400 BPS is derived from a DIBIT data stream operating at 1200 baud. Therefore, the 2400 mode may be used above 28 MHZ.

# FADCA > BEACON

## THE FLORIDA AMATEUR DIGITAL COMMUNICATIONS ASSOCIATION

### Bytes from the Write-Only Memory

Ted Huf, K4NTA

We are hearing about new digipeaters coming on line around the state. I know of the following new ones but, I am sure the list is not complete.

Down in the Florida Keys, MTH in Marathon is now on the air. It is about halfway between Homestead (HST) and Key West. Bernie, K4OFG, is the Monroe County Communications officer and his home station is used to link on into Key West.

There is a new digi in Perry, FL. The call is PRY and while I don't have many details about it yet, I understand the it links from Ocala (OCF), Gainsville (GNV) and Lake City (LKC) into Tallahassee (TLH).

Speaking of Lake City. The Lake City (LKC) digi is owned by Scott, KF4TT, and Ernie, K4OSM. Scott has moved away from the state to N.J. but has left his part of LKC so it can stay in operation. Thanks Scott and good luck in your new job. We will miss you down here.

I also hear that there is a new digi in Port St. Joe, FL on the Gulf coast. The call is PSJ or W4WEB-1 (I have heard both) and the antenna is at 800 feet!

I have no info on a digi in Panama City except the call of KD4EQ.

The Clearwater digi which serves the St. Pete area is now a GATOR 2 switch and goes by the call of 813CLW with the alias of CLW.

We are planning to be at the Jacksonville Hamfest in August and hope to see many of you there.

- PRM -

### Florida Network Coordination

Network coordination and operation planning in Florida has been split into two regions, North and South. This was done because of the difficulty of travel from the ends of the state to a central meeting point. It was also found that meetings of this type just don't get much done when held at hamfests. These regional meetings bring forth ideas from the packet operators around the state and allow for the sharing of ideas to bring forth good operating procedures. They also give a chance for committee members to bounce ideas off of new and old time packet operators about network plans.

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PACKET RADIO MAGAZINE

The OcalAN will be hosting the North Florida Re... meeting of the FNCC on Saturday, July 26th. The location will be the Golden Corral Restaurant on HWY 40 East in Ocala. The meeting is scheduled to start at 11:00 AM, with a private area available all afternoon. Talk-in will be on the 146.01/61 repeater and on 146.775 simplex. Flyers announcing the meeting are being mailed to active packeteers throughout the Southeast, and we are looking forward to having participants from the Florida panhandle and southern Georgia. Southern Region members are encouraged to attend and provide additional input.

The next Southern Region meeting will be held at Clewiston on Sunday August 24th. It will be again held at Tony's Glades Restaurant. Lunch starts about 11:00 with the meeting to follow. The Packet Frequency Coordination committee will meet at 10:00.

- PRM -

### Jacksonville News

Dick Klein, W4PCM

The boys in Jacksonville have officially formed a group called First Coast Amateur Packet Association (FCAPA). We have a BBS under the call of WB4BMC which is operated by Larry Rich. In addition to the JAX network node controller 904JAX, we are installing a central digi located at the Red Cross headquarters on Riverside Avenue in Jacksonville. The call of the digi will be JAX-1 and identified as WB4RCY/R.

FCAPA currently has 18 charter members including Barry, WD4ASW, Kathryn, WD4ASX, Wayne, N4KWC, Jack, KB4B, Bob, WD4BIW (President), Rick, WB4ULT, Mitch, WB4RUT, Dick, W4PCM (Sec-Treas), Ken, WA4JYS, John, W5HUQ (Vice Pres), James, KF4MX, Al, WB4VSK, Larry, WB4BMC, Don, KA4FPE, Ken, KA4IFM, Darrell, KA4TAR and Lewie, WA4GAE. Charter memberships will be accepted until the close of the 1986 Jacksonville hamfest.

The big news now is that the Jacksonville Hamfest will be held Aug 9th and 10th at the Civic Auditorium (same as last year). New this year is the Riverwalk along the south bank of the St. Johns River which is actually a great deal of fun as it connects several interesting watering spots including the Hilton, which again is the official hamfest hotel. Packet radio will again be featured at a booth and in the program. Also a popular TNC (rumored to be the Packrat Controller) will be featured as a door prize.

- PRM -

## **Proposed 2M Frequency**

### **Plan for Florida**

(Third publication)

Rules established by the Packet Frequency Coordination Committee required that the two meter frequency plan be published in the FADCA>BEACON three times and be adopted at the next regular meeting unless changes where required based on comments received. This is the third and last such publication. If you have any comments on this plan, you should send them to the PFCC c/o FADCA, 812 Childers Loop, Brandon, FL 33511.

145.01	Pompano Beach, Ft. Lauderdale, Miami
145.03	Ocala, Port Charlotte, West Palm Beach
145.05	Crestview, Lake City, Daytona, Tampa Stuart, Naples
145.07	Tallahassee, Jacksonville, Clearwater, Boca Raton
145.09	Gainesville, Melbourne, Sarasota, Homestead
Temporary: Miami-145.03	
	Orlando-145.03, 145.07
	Jacksonville-145.03
	Sebring-145.05
	Hollywood-145.05

#### Notes:

1. The minimum co-channel spacing allowed was about 115 miles.
2. The temporary assignments permit some co-channel spacing to be considerably less than 115 miles. These digis will be re-located as soon as more packet frequencies become available on the 2m band.
3. 145.01 is intended to remain the primary frequency for non auxiliary linking digipeaters. No minimum co-channel separation will be guaranteed. Any existing digis who wish may stay on 145.01. New digis may freely load 145.01 Mhz.
4. This list represents frequencies that will be made available in or near the cities listed. The frequencies have not been reserved for any particular digipeaters. Digipeater trustees should choose a frequency in accordance with this plan and then notify the PFCC WHEN THEY ARE READY TO OCCUPY IT. Unless otherwise agreed upon by the trustees involved, it is assumed that only one digipeater will utilize the assigned frequency in a given area.
5. The cities listed serve as an approximate guide only, and the exact digipeater location may vary considerably, subject to certain restraints such as separation from co-channel digis or 30 mile separation from adjacent channel voice repeaters.
6. If a frequency is not loaded within a reasonable time, it may be reassigned to another trustee or city even a considerable distance removed.
7. FADCA PFCC welcomes comments on this plan. Send them to the PFCC at the FADCA address. If no modifications are adopted on or before August 24, the plan will become final at that time.

- PRM -

## **Notes from Ocalan**

Larry Phelps, K4OZS

The K4OZS/OCF BBS is now running with three single-sided 8" drives. Having the additional file space on-line is very convenient for larger Mail-Files, BASIC program listings, ARRL Bulletins (provided by N4GMU), and SYSOP utilities. Some simple logic makes the Xerox think that it is using the more expensive double-sided drives that its hardware supports.

The 9040CF PAD has been performing reliably, and remarkably improves throughput during conditions of heavy network loading.

Active work is continuing on several fronts, including 220 MHz high-speed linking, making the LAN BBS available on the PFCC-designated 2M LAN frequency, and establishing Ocala as a Beta Test site for the TAPR NNC.

The Lake City digipeater (LKC) continues to be our link into Georgia (thanks to Scott, KF4TT, who generously left his RF gear at the site - even though he has moved to New Jersey - until replacement equipment can be acquired). WD4LYV in Sycamore, GA has taken on the duties of SAPS BBS SYSOP. A new digipeater has been put on in Perry (PRY). I don't know who did that work. PRY is being used by the TLH area to access the OCF BBS.

- PRM -

## **BBS Proposal**

Mitch Wolfson, DJ0QN

The widespread use of BBS's in Amateur Radio circles has led to a virtual "Tower of Babel" of communications. In addition, such problems as cost and user limitations has compounded the overall situation. To supplement the use of these BBS's, I feel that a low-cost, easy to use mailbox and file storage system is necessary. My solution is to contract to utilize a popular corporate worldwide electronic mail system called Ontyme, which is part of Tymshare. I would then make the use of this system available to the general public at minimum cost, utilizing corporate rates.

Some of the advantages of this system will be:

- Access is possible from many cities in USA and Europe by dialing the local Tymnet node. In Europe, users can often bypass local government controlled packet switching networks. Also, Tymnet access is possible from many countries outside of Europe and the USA.

- Full-featured mailbox functions, e.g. seeing when messages have been read, forwarding, etc.

- Gateway functions:

MCI Mail  
Mailgram

Telex (also Europe)  
Network

*Continued on page 17 >>*

# AFFORDABLE PACKET RADIO FROM MFJ

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Lab quality power supply gives you plenty of voltage and current for all your analog and digital circuits. 3 completely isolated outputs: 2 variable 1.5-20 VDC at 0.5 amp and a fixed 5 VDC at 1 amp. Connect in series or parallel for higher voltage and current. It's short circuit protected, has excellent line (typ. 0.01%/V) and load regulation (typ. 0.1%). Lighted meters monitor volt./cur. 12x3x6 in. 110 VAC.

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All you need is your rig, home computer with a RS-232 serial port and a terminal program. If you have a Commodore 64, 128 or VIC-20 you can use MFJ's optional Starter Pack to get on the air immediately. You get interfacing cable, terminal software on tape or disk and complete instructions ... everything you need to get on packet radio. Order MFJ-1282 (disk) or MFJ-1283 (tape), \$19.95 each.

Unlike machine specific TNCs, you never have to worry about your MFJ-1270 being obsolete because you change computers or because packet radio standards change. You can use any computer with an RS-232 serial port and an appropriate terminal program. If packet radio standards change, software updates will be made available as TAPR releases them. Also speeds in excess of 56K bauds are possible with a suitable external modem! Try that with a machine specific TNC or one without hardware HDLC as higher speeds come into widespread use. You can also use the MFJ-1270 as an inexpensive digipeater.

It features the latest AX.25 Version 2.0 software, hardware HDLC for full duplex, true Data Carrier Detect for HF, 16K RAM, simple operation plus more.

Join the packet radio revolution now and help make history. Order the MFJ-1270 today.

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Instantly select any antenna or rig by turning a knob. Organizes coax cables and eliminates plugging and unplugging. Unused terminals are grounded to protect your equipment for stray RF, static and lightning. 2 KW PEP, 1 KW CW. For 50 to 75 ohm. Negligible loss, SWR, and crosstalk gives high performance. SO-239s. Convenient desk or wall mounting.

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MFJ-1702  
\$19.95

\$29.95 MFJ-1701



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MFJ-949C \$149.95



MFJ's best 300 watt tuner is now even better! The MFJ-949C all-in-one Deluxe Versa Tuner II gives you a tuner, cross-needle SWR/Wattmeter, dummy load, antenna switch and balun in a new compact cabinet. You get quality conveniences and a clutter-free shack at a super price.

A new cross-needle SWR/Wattmeter gives you SWR, forward and reflected power—all at a single glance. SWR is automatically computed with no controls to set. Has 30 and 300 watt scale.

Run up to 300 watts RF output—and match coax, balanced lines or random wires from 1.8 thru 30 MHz. Tune out SWR on dipoles, vees, long wires, verticals, whips, beams/quads. 10x3x7 in.

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MFJ-818  
\$89.95



Fully automatic Digital SWR/Wattmeter reads SWR 1:1 to 1:9.9 directly and instantaneously—no SWR knob to set. Huge 0.6 inch bright orange digits make across-the-room reading easy. 12 segment LED bar graph wattmeter gives instantaneous PEP readings up to 200 watt RF output.

Good, bad, mismatch tri-color LEDs indicate SWR conditions. Small size (5½ x 4½ x 1 in.) and easy-to-read digital display makes it ideal for mobile use. For 50 ohm systems. 1.8-30 MHz. 12 VDC or 110 VAC with MFJ-1312. \$9.95.

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A NEWSLETTER OF THE ROCKY MOUNTAIN PACKET RADIO ASSOCIATION

**Dateline: The Continental Divide**

Bob Gobrick, WA6ERB  
President, RMPRA

**Field Day** - The 1986 ARRL Field Day in The Rocky Mountain area was highlighted by many stations passing packet traffic to our Section Manager Bill KQOJ (an active packeteer). This year was a first with packet traffic being passed across the Continental Divide. Packet has proved to be a good message handling link during these simulated emergency exercise. A good job by all. The Golden Spike: As mentioned in the May column, the link across the Rocky Mountains was accomplished by a dedicated group of packeteers. Times were a little tough early in the month of June when the critical KOZCO digi was down as the control operator, Linc, was called back to the East Coast during the nationwide telephone strike. With mail on the Colorado PBBSs backing up, the call was sent out to establish additional back up digis. The first on board with a reliable link was Bill, KAOCZW, who dismantled his Oscar station to set up a 24 hour path link. Following in short order were four others who added new antennas and new rigs assuring multiple back-up digis. The Golden Spike thus becomes more firmly set. On the Utah end, NB7B experimented with a mobile digi up on Utah's Blue Mountain (in the eastern part of the state) in preparation for the link into Grand Junction. The gang up in Cheyenne, Wyoming also "hardened" their digi operation in hopes of looking for that elusive eastern link to Nebraska. A request is out to help keep the RMPRA informed of summer linking achievements into the Continental Divide so that we can properly issue the prestigious "RMPRA Golden Spike Award.

**CONNECTIVITY CHART:** If you are familiar with figuring out mileage between cities on one of those "triangle" milage charts on roadmaps, then you will like the approach that John, WA8ZIA, in Boulder, Colorado has taken to figure out Packet Connectivity across the state. John has devised a graphical method to easily determine who can connect to whom and at what level of reliability. Over 34 digis are listed on the chart along with the location and a 5 point status system. The chart is being "Alpha" tested and I hope by next month to get John to submit a "Beta" version for publication. Although it doesn't show the linking stations making up the hop it does let a packeteer know if a link is possible (also aids the PBBS operators in setting up their forwarding files). More to come...

**YAPP:** The big software news this month is WA7MBL's (Jeff Jacobsen) new MS-DOS packet terminal software. Jeff has made an official release version 1.0 of YAPP (Yet Another Packet Program) and he is putting it out on the "shareware" distribution concept. All that Jeff asks is that if the program proves useful to the packeteer that he make a \$20 donation to the development fund. With acceptance, Jeff will offer future "shareware" upgrades of YAPP

as well as future public domain upgrades of his Packet Bulletin Board program. Wes, K7PYK, of the Arizona Packet Radio Assn. will be distributing the software for \$5 and an SASE disk or you can download it from CompuServe's HamNet section. The WA7MBL software is "commercial quality" stuff. Many of us are familiar with his development of the WORLI PBBS software and the pending 3.0(?) release that will support multi TNC connects (using a quad serial card). YAPP is just as exciting - I got a look at an earlier version called TNC.TERM which wet my appetite for YAPP. Well what's all this packet racket about YAPP - pop-up menus, function key aids, split screen, TNC configuration, back scrolling buffer, ASCII and yes, BINARY file transfer. From what I understand the only hold up in some additional fantastic features (for both YAPP and the PBBS software) is a brain storming session between Jeff and TNC code guru Howie Goldstien N2WX (anyone want to sponsor a fund for televideo conference calls between Utah and Florida).

**COMPUSERVE:** A number of the RMPRA gang show up on CompuServe's HamNet section (sysoped by Scott W3VS) to pass news and views to other parts of the country where the "Big Links" haven't been made yet. A regular on Compuserve is Harold Price, NK6K, the new Packet editor for 73 Magazine and an active member of TAPR and AMSAT. Harold, along with many others, provide a very up-to-date forum on the happenings on packet radio, so if you thrive on the latest packet gossip and rumors give Hamnet a try.

**CLUB IDEAS:** A club fund raising activity that would benefit the packet community is a TNC firmware distribution service. Now that version 1.13 of the TNC-2 (TAPR, Pac-Comm, AEA and MFJ) code is available and Heathkit has backed out of distributing the WA8DED code for the TNC-1 many folks are looking for a means of upgrading. For about \$100 you can buy an EPROM burner for your MS-DOS computer (I got mine at Dayton from JDR) and program up a batch of 27C256 EPROMS. The RMPRA is in the process of setting up such a club project.

**PBBS ACTIVITY:** The newest addition to the WA6ERB PBBS in Denver is the use of DoubleDos (version V) by SoftLogic, Inc. As mentioned by a number of others, this software allows one to run concurrent programs on an IBM or clone computer. On my Taiwan clone (640K, 10 Meg HD, with two serial port Gateway) I run the WA7MBL PBBS program and at the same time use Wordstar for creating files (I have even gone as far as burning EPROM's with my EPROM hardware/software while the PBBS runs in the background). So far the version "V" looks like a winner (earlier versions were reported to cause problems). So if you have been putting off setting up a PBBS in your area because you didn't want to tie up your computer here's the answer to your prayers

# MARDA

The Official Newsletter of the



# MONITOR

Mississippi Amateur Radio Digital Assn

Patrick J. Fagan WA5DVV  
President - MARDA

## PACKET-ON-THE-COAST

The flurry of activity in South Mississippi has made it necessary to modify Packet operating procedures. A few recent changes have been made in this area to accomodate the growing number of stations getting on a very exciting new mode. Lets take a look at what's happening.

We now have two DIGIPEATERS and two packet BBS's serving the area. The list below will clarify their reason for being.

BIX - MARDA digi in Biloxi - 145.01 Mhz  
GPT - MARDA digi in Gulfport - 145.09 Mhz

WA5DVV (MailBox/GateWay) operates on 20 and 40 meters with link to 145.09 providing message forwarding in and out of the area via HF.

WA5DVV-1 (PBBS) also has two ports and operates on 145.01 serving Louisiana/ Alabama users. The second port is on 145.09 and was recently turned on to serve Mississippi Gulf Coast users. Coverage thru GPT digi is from LA/AL borders north to Wiggins. Now, local packeteers will be using 145.01 only when thereis a need to CONNECT to an out of area station. SYSOPS please note that WA5DVV-1 (formally WA5DVV) is now the .01 BBS.

## BACKBONE UNDER TEST:

Fred, KE5SJ says initial testing has been completed on the first phase of the MARDA backbone NET. Although the path between Fred in Gautier, MS and Mike, KB4JHU in Grand Bay, AL is not an extremely long one ... 100% reliable communications using

extremely low antenna systems on 448.4 Mhz and 145.09 Mhz have been established. Terry, NN4Y in Mobile should have a 440 antenna up by the time you read this. His station will provide the link to MARDA from ALANET until a better site can be located.

## LAUREL DIGI ON THE WAY:

Steve, N5DWU reports that the Laurel Amateur Radio Club will be installing their new DIGI very soon. Steve has been using his own TNC in Ellisville as a digi to serve the Laurel area. The new site will be about 150 feet higher so increased coverage should be realized. Although the location is changing the DIGI will continue to operate with the alias of 'LUL'.

## JACKSON DIGI GETTING CLOSER:

At long last progress on a digipeater for the Jackson area has been made. An RF system using a Master Pro has been obtained and it is rumored that a tentative antenna site has been located. Look for more developments on this project in the capital city.

## MARDA-ON-THE-ROAD -- AGAIN!

A trip to Vicksburg is planned just to get an eyeball with all the PACKETEERS in this beautiful city on the Mississippi River. Bill, WB5SXK has agreed to act as tour guide (I have to buy him lunch) so that should prove to be very interesting. When asked which historic location we would visit first -- Bill replied, "VKS of course". I'll let you know how it turns out. - PRM -

## CAPRA Meeting Summary

Steve Goode, K9NG

At the July 12th CAPRA meeting several key items in the development of the CAPRA network controller were reported on. The hardware design for the dual-channel serial controller with DMA was complete and ready for prototyping. This is a Multibus board having two full-duplex HDLC channels capable of baud rates in excess of 100 kbaud. As much as \$200 has been allocated for prototype construction. While the prototype is being constructed an inexpensive daughter board containing just the serial controller chip will be used to test software without DMA. If volunteers can be secured to get two Xerox 820 boards operational, we will also pursue a dual-port digipeater link to Milwaukee. A third dual-port digipeater will have to be supplied by the Milwaukee group. One of the Midland 13-509 radios has been modified to operate with 2 ms transmit/receive turn-around times. It is expected that 1 ms will be achievable shortly.

The TCP/IP code has been successfully compiled but crashes after executing for a short while. Debugging will proceed. Two volunteers were secured to start a CAPRA packet net on the CFMC (146.16/146.76) voice repeater. The tentative net time will be Wednesdays at 9 PM. When a suitable format has been worked out, the first net will be publicized. Sixteen members have signed up for PRM subscriptions and twelve have paid. It was noted that several people have not received their subscriptions due to errors in the mailing labels. This will be corrected when the subscription fees are mailed in. The program that followed the business meeting was the recently produced TAPR video on packet radio, featuring Pete Eaton. The next CAPRA meeting will be September 13 at 2 PM at the Glenside Public Library in Glendale Heights.

- PRM -

# PPRS

... Site of the first U.S. digipeater

Walter E. Miller, AJ6T

The Pacific Packet Radio Society (PPRS) is one of the nation's oldest packet clubs. Our first president, Hank Magnuski (KA6M), put up the first U.S. digipeater in December 1980, and he spurred interest in packet radio throughout the San Francisco Bay Area through his seminars and club presentations in 1981. A Data General Eclipse S130 computer was added to KA6M "packet central" in 1981 with both RF and telephone ports. Most early local activity was the result of VADCG TNCs and inexpensive 202 modems distributed by KA6M. Later, Hank was instrumental in porting AX.25 code to the VADCG boards.

The first official meetings of the PPRS began in early 1982. Our current roster lists almost 100 members (most from the SF Bay Area). We meet monthly on the first Tuesday at 7:30pm at the Ampex Cafeteria (411 Broadway, Redwood City). The 1986 officers are Walter Miller, AJ6T, president; Jim Tittsler, AI8A, VP; Bill Weaver, WA6FSP, treasurer; George Flammer, WB6RAL, frequency coordinator. The PPRS mailing address is PO Box 51562, Palo Alto, Ca. 94303.

The PPRS sponsors the Golden Packet Award. Announced in March 1985 at the 4th Amateur Computer Networking Conference in San Francisco, the Golden Packet Award will be given to the first hams to achieve a coast-to-coast terrestrial packet link on VHF. For more details send an SASE to the PPRS.

California packet activity has mushroomed in the last 18 months. Digipeater coverage on 145.01 now runs up and down the entire state, with links extending to Oregon, Washington, Nevada, Arizona and Utah. Unfortunately, the network is terribly overloaded, and reliable connections can only be made via two or three hops (unless you are willing to

wait until the early morning hours when activity is low). QRM from rampaging bulletin boards, BBS DXers, beacon stations, and the casual thoughtless operator is still very common.

WORLI style store-and-forward bulletin boards have finally begun automatic message handling on 145.01 Mhz. However, there are now four BBS within one hop of W6AMT, the main digipeater serving the entire SF Bay Area. Some internecine messages get "forwarded" back upon themselves and wind up as multiple listings on one BBS. Such squandering of valuable spectrum space must stop. The other 2M Bay Area packet frequencies break down as follows: 145.09 is "BBS Alley"; 145.03 is fairly quiet with several digipeaters; 145.05 is an alternate North-South link; 145.07 has a few local BBS with moderate activity. AI8A-3 on 145.07 is an experimental low level network switch running N2WX code; this is the first local attempt at level 3 testing.

Repeater frequency coordination in this part of California is done by NARC (Northern California Amateur Relay Council). The PPRS Board of Directors works with NARC as the packet coordinator. George, WB6RAL, is the PPRS liaison with NARC. He has proposed that NARC allocate additional 2M frequencies for packet operation: 144.91, 144.93, 144.95, 144.97 and 144.99 MHz. These frequencies have already been reserved for packet in Michigan and Oregon and they are sorely needed here in Northern California.

PPRS is pleased to join the nationwide packet forum in Packet Radio Magazine. We are anxious to maintain closer contact with other packet groups, especially those close enough to be reached via VHF links. Please write to us at the address above, or leave mail for AJ6T at W6IXU or W6CUS-1.  
73 de AJ6T

-PRM-

## BBS PROPOSAL *Continued*

The network feature allows X.25 network access inside of the USA, something especially appealing to Europeans, as it allows them to bypass the local packet switching networks to access Compuserve or other U.S. BBS's.

- File storage is possible, using both public and private storage capabilities. This means that bulletin boards and software can be accessed.

- Virtually unlimited users. Each pays his own costs each month.

- No message or file size limit.

What will it cost? Since I am making the contract in Germany, I have to quote all prices in DM (Deutsche-Mark). The current exchange rate is about DM 2.25 for one US Dollar.

- Base charge will be DM 10 per month, currently about \$4.50.

- Hourly charge is DM 8 per hour, currently about \$3.55. Obviously, uploading of messages will cut logon time to a minimum.

- Volume charge of DM 0.80 per thousand characters, currently about 36 cents.

- No charge for messages, also for unlimited copy lists (but not MCI).

- No surcharge for time of day or baud rate!

- Filing charge of DM 0.08 per day for 1000 characters, roughly 3-4 cents.

*Continued on page 20 >>  
FOR SALE*

I tried packet and am going back to CW! For sale: AEA PK-64A for \$295.00. Also a Commodore 64 for \$75.00. Both units in excellent condition.

Bill Jay, K4KG  
6491 Sweetwater Church Road  
Douglasville, GA 30134  
(404) 942-3192

## UPRA CONNECT

Newsletter of the Utah Packet Radio Association.

### Summer Time Blues

David Pedersen, N7BHC, Pres.

As several of you have very quickly pointed out to me, there was a distinct lack of news from Utah in the last couple of newsletters. This is due primarily to two factors:

1. Summer time ... everybody is too busy outdoors to sit down and produce a literary masterpiece for the newsletter, and
2. I have been too busy to make up for # 1.

My excuse is the moderate amount of studying I had to do for my citizenship examination...I became a U.S. citizen on July 4 in the local pageant!

In contrast to the lack of newsletter submissions, Packet projects in Utah are making the most of the weather. We may have an abundance of "illegal towers" to put digipeaters on, but they are generally only easily accessible during the warmer months. As a result, several new digis are in operation in Utah so far this summer.

The digipeater North of Cedar City, WA7GTU-2, and the one South of Cedar City, WA7GTU-1, can now reliably work each other directly.

The Snowbird digipeater, KD7YK-2, is operating very well. Snowbird is a local ski-resort just to the East of Salt Lake City which tops out at just above 11,000 feet asl, and access is by way of a 170 person capacity tram. The only big improvement needed at this time is with an antenna. The Ringo-Ranger needs to be replaced with a Stationmaster type of antenna. Please contact UPRA if you have one available. The Snowbird Digi reliably works WA7GTU-2, and serves as the primary jump-off point for the link to Southern California. Thanks to John K7JL and Hank KD7YK for putting up such a fine digipeater.

Two more digipeaters are nearing installation point. Mount Harrison, in Southern Idaho should be operational by the beginning of August, and will link Salt Lake to Boise. The Blue Mountain digi just East of Vernal is expected to be up and running by mid-August at the latest, which will provide the path into Denver and all points East.

Experimentation with modified "Maxon" 49 MHz CB radios is continuing. Anyone who has also put these \$25 wonders on 6 meters, please drop me a note. Operation in Salt Lake City is on 50.650 MHz.

One last thing; we are in need of someone to write a monthly column for the "Microvolt", the newsletter of the Utah A.R.C. Any volunteers?

### WIMU HAMFEST

August 1-3, 1986 marks the return of the Wyoming-Idaho-Montana-Utah (WIMU) hamfest to Jackson Hole, Wyoming. AS was the case last year, just our presence is not enough...WE MUST BE THE STAR ATTRACTION.

Unfortunately, Pete Eaton, WB9FLW, will not be able to make it this year. However, he is being replaced by an equally famous packeteer.

Lyle Johnson, WA7GXD, President of TAPR, will be the prime speaker. Lyle's accomplishments include major contributions to both the TAPR TNC-1 and TNC-2, and the Network Node Controller (NNC).

Packet radio has been allocated two hours of program time. The morning session will be mainly geared toward the beginner. The new TAPR 1/2 hour introductory videotape will be shown, followed by a 1/2 hour question/answer session. The afternoon session will be dedicated to advanced Packet operation, mainly networking, and will be conducted by Lyle WA7GXD. Hopefully, we will be able to make time for more sessions if possible.

As has been the case in the last two years, there will be a booth set up for ongoing, simultaneous demonstrations of Packet Radio, with a BBS in operation as well. We may also be able to have an HF station in operation.

Please check the WA7UZO BBS for late breaking information.

- PRM -

### UPRA DATA

MEETINGS: Held at the Heathkit Store, at 7200 South State (58E.), on the second Thursday evening of the month at 7.30 p.m. The next meeting will be on August 14.

VOICE NET: The information dissemination and question/answer net is held on Tuesday evenings at 8.45 p.m., on the 146.02/62 repeater. Net control is Steve KI7L.

PBBS: The primary PBBS station for the Salt Lake City area is WA7UZO, running the WA7MBL BBS systems with an IBM XT clone. Operation is on 145.01 MHz.

MEMBERSHIP: UPRA membership dues are \$15 annually. Additional family members sharing a newsletter pay only \$1.00.

NEWSLETTER MATERIAL: This may be sent to the address listed below, or via several electronic routes, which are either ASCII text files on IBM formatted disks or via a BBS. Contact me via the phone number below for more information. Submission deadline is slowly creeping earlier each month...call for more info.

ADDRESS: For all UPRA business:

Utah Packet Radio Association  
4382 Cherryview Drive  
West Valley City, Utah 84120  
(801) 967-5896

- PRM -

De: Emile Alline, NE5S, President LAPRS

Greetings from the bayou country, home of the Mardi Gras, Cajun cooking, and now hot and spicy packet radio. It took a while and more than a little help from our friends in MARDA, but we finally got our act together. Our "press release" probably says it most succinctly, so here it is:

**7 JULY 1986 - LOUISIANA PACKET SOCIETY FORMED**

AT THE NEW ORLEANS HAMFEST ON JUNE 22, THE LOUISIANA AMATEUR PACKET RADIO SOCIETY (LAPRS) WAS FORMED. THE GOALS OF LAPRS ARE TO PROMOTE THE ORDERLY GROWTH OF PACKET RADIO IN LOUISIANA AND COORDINATE PACKET ACTIVITIES WITH NEIGHBORING STATES. WITH REPRESENTATION FROM EACH MAJOR METROPOLITAN AREA, LAPRS WILL SPEAK AS ONE VOICE FOR PACKET IN LOUISIANA.

OFFICERS ARE NE5S-PRESIDENT AND WD5ELJ-SECRETARY. WORK IS NOW UNDER WAY TO INCORPORATE AS A NON-PROFIT ORGANIZATION, AND PLANS ARE TO AFFILIATE WITH THE ARRL AND LOUISIANA COUNCIL OF AMATEUR RADIO CLUBS. REPRESENTATIVES FROM ALMOST ALL METRO AREAS HAVE BEEN CONTACTED, AND OFFICIAL ANNOUNCEMENTS WILL BE MADE AT THE SHREVEPORT HAMFEST IN AUGUST.

SUPPORT FOR LAPRS IS STRONG. MONEY AND EQUIPMENT WERE OFFERED FROM INCEPTION, AND MANY OFFERED SUPPORT EVEN THOUGH NOT ON PACKET. GREAT HELP AND SUPPORT CAME THROUGH THE MISSISSIPPI GROUP (MARDA). LAPRS IS WORKING WITH HOUSTON (HAPRS) AND MISSISSIPPI (MARDA) AND IS LOOKING FOR A CONTACT IN ARKANSAS. PLANS ARE TO FORMULATE A COMPATIBLE BAND PLAN AND JOIN SOUTHNET TO LINK FLORIDA WITH TEXAS VIA DIGIPEATERS.

IF YOU WOULD LIKE TO JOIN OR SUPPORT LAPRS, PLEASE WRITE TO:

LAPRS  
PO BOX 40723  
BATON ROUGE, LA 70835

This is my first column in PRM and it is being written under a very tight deadline. By next month, we should have a logo and a more organized and thoughtful approach. Packet is moving out of the "handful of technical pioneers" stage and into a very explosive growth period here in Louisiana. LAPRS is a little late arriving, but with some hard work, we can learn from our friends and grow in an orderly manner. We now have representation in all major metro areas except Monroe. We are also looking for a group to coordinate with in Arkansas. If anyone can help in these areas, please get in touch.

The final paperwork for incorporation is being filed as this is being written (Jul 9). Jack, WD5ELJ, has done an awful lot of legwork, roadwork, and paperwork on his vacation time to make LAPRS fly. I've been busy on the word processor announcing our existence, and on the road rounding up representatives from around the state. There hasn't been much time for a status report of packet activity, but here are a few bits and pieces:

*Continued on page 20 >>*

The pace in Alabama packet has been pretty strong in recent months. The big push and tax on our LANs came from the MFJ units just as everyone expected. Our LANs were able to handle the "season peak" due mostly to packet novices getting information packets from ALA-NET advising them of proper operating habits as well as local frequencies. Beaconing seems to be at a minimum, so maybe we have passed that stage in packet growth.

The last ALA-NET meeting proved to be a success with over 50 people attending. This meeting was held at 10:00 AM on Sunday, May 18th at the Birmingham Hamfest. Summary remarks include the following: formulation of dues for ALA-NET membership, subscription to PRM being part of those dues and that ALA-NET will be hosting the next SOUTHNET meeting.

Reports from the LANs went as follows:

**Northern LAN from Frank, W4HFU**

The 440 MHz digipeater on Brindlee Mountain is operational and has good paths to WB4ZKX-1 and K4HAL-2 in Birmingham. Both WA4DXP-1 and WA4DXP-2 are operational on Monte Sano. The WB4ZKX-1 PBBS has ports on both 145.01 and 448.4.

**Central LAN from Henry, K4HAL**

At the present time 145.67 is the Central LAN primary frequency. K4HAL-2 has two ports operational on 145-67 and 448.4. W4CUE-4 is operational on the "tall tower" at 2000 ft MSL. W4KDP-3 (145.67), Tuscaloosa, ANN (145.67) in Anniston, and SHL (145.67) in Shelby County are up and going. Plans are to two-port K4HAL-1 on Mt. Cheaha. The WA5RAX PBBS is operational on 145.67 and 145.01.

**Capital LAN from Phil, WB4OZN**

The WB4OZN PBBS is up part time in Montgomery. The W4AP-1 digipeater is operational also. Antennas as well as tower site agreements have been secured to put up the 448.4 network. N4HY is working on the dual port project for N4HY-1 and W4AP-1.

**Southern LAN from Glynn, WB4RHO**

The EUF digipeater in Eufala is operational. N4HY has a good path to EUF. The WB4RHO-2 PBBS is on 24 hours per day. K4LPT is on the air in Crestview, FL.

A detailed presentation of the technical aspects of the two port device was given by David, N4KTY, and Henry, K4HAL. Two of these devices are up and running presently.

It was voted by ALA-NET members that dues would be set at \$20 with \$10 of the membership fee to be used for a subscription to PRM.

It was agreed that ALA-NET would host the next SOUTHNET meeting at the Montgomery Hamfest on October 11 and 12. An invitation has already been extended to TAPR and work is underway on plans. All

*Continued on page 20 >>*

## The Peripatetic Packeteer *Continued*

Several connects were made with field day stations in Salt Lake that didn't quite realize the importance of the expedition and were surprised to get 1As from Colorado. Packets were also heard from WORRZ-1 in Grand Junction but for some reason we were not able to connect. It appears that the Blue Mountain site will serve as a good relay between Salt Lake and Grand Junction and on into Colorado. Additionally, the digipeater will allow emergency communications between the Uinta Basin and Salt City.

The return trip to Vernal was uneventful except for the tarantula Gary saw on the road back to Vernal (they are rare this far north) and the spectacular views of the Green River and Dinosaur Monument geology.

Well now off to the Ashley National Forest and the Basin ARC field day site. Utah 44 has to be one of the country's greatest sports car roads! No chuck holes and 25mph advisory curves that can be had at a tire quiet 55. Lovely!. Its the kind of road that you turn the radios off so better to hear the tires interacting with the pavement. Climbing out of the desert into beautiful alpine scenery is a wonderful test of a car's handling.

The packet demonstration at the field day site went well with many questions from the very interested and hospitable Basin group. I was pleased to meet Jay in person as well as other club members.

1830 local and time to finish off Utah 44! The road is beautiful, through lodgepole pine and a slight drizzle from the tail end of a thunderstorm moving off into Colorado. The 25mph turns have just enough exposure to get your adrenalin going as the MR-2 moves through them at 60. On a road like this the car payments seem more than worth it. The road winds down into Flaming Gorge where the excitement deteriorates into interesting geology. The freeway was picked up at Fort Bridger, Wyoming, and the cruise control option became useful. Ho hum, back to Salt Lake City with the knowledge that the Blue Mountain site would work and that MR-2 is as good as the car magazines said. Eat your heart out Dave!

73, Steve

PS. Anybody know where I can get stealth paint in candy apple red?

- PRM -

## ALA-NET *Continued*

ALA-NET members are urged to offer a hand and pitch in where they can. As our friends from GA and FL have pointed out, this is a major undertaking and will not be a success unless we all pitch in.

The next ALA-NET meeting is scheduled for 11 AM to 12 AM at the Huntsville Hamfest, August 16th.

We urge all to submit information for this column concerning local happenings and events, either through WA5RAX PBBS (K4HAL-2 on 145.67 or K4HAL-1 on 145.01) or by mail to Jim Griffith, WA5RAX, 104 Ladywood Lane, Bessemer, AL 35020.

- PRM -

## BBS PROPOSAL *Continued*

- A nominal start-up fee to cover user material, etc. It will most likely be in the DM 25 (\$11) range.

I estimate that an average user will end up paying around \$10-15 per month, depending primarily on his volume. Heavy users sending long messages or typing on-line at 300 baud will have higher bills. Someone sending short, uploaded messages at 1200 baud or higher will have the lowest bills.

If demand in the U.S. is high, I can also arrange a dollar contract to make the costs fixed, but strengthening of the dollar would make DM prices more reasonable. The dollar is now at its weakest level in years against the DM.

In addition, I have negotiated one free month, so anyone interested in participating at from beginning can use the system as much as he or she wishes at no obligation. This free month will either be September or October, depending on response or publication timing. At the end of this free month, a credit card number will have to be provided so that I charge the following month.

I will also be looking for at least one SYSOP in the U.S. to handle the setting up of accounts and to provide assistance. Anyone interested should contact me at CIS 73167,3137, or write to me at my address:

Mitch Wolfson DJ0QN      Telephone 089/3107660  
Furtweg 18 d                (011-49-89-310-7660 from USA)  
D-8044 Lohhof  
West Germany

- PRM -

## LAPRS *Continued*

Alexandria has a 900 ft site and the hardware resources to put up a digi. All they need is some interest and some help and they should have a fine link to tie in north to south.

New Orleans is planning a BBS on an off frequency to relieve the load on .01. It may be on the air by the time you read this.

WB5BZE, WD5ELJ, and NE5S spent a Sunday in SLI improving the SLI-BTR link. The sites are just a little over the theoretical RF horizon, so the link is not yet 100%. The same is true of the LFT-LCH path. With some diligent work, we should be digi linked along the gulf coast from MS to TX very soon.

Shreveport has a real large group of packeteers. The Red River Amateur Packet Society ( RRAPS- sounds a little like a packet transmission, doesn't it?) now numbers 27. We welcome their participation in LAPRS.

LAPRS is building a library of educational materials for newcomers to packet. If you can contribute to this effort in any way, please get in touch. I remember climbing the walls when I first got on packet. Somehow, a few TNC parameters had been set to non-working values. If I had had a list of the proper settings, there would be a few less gray hairs on my head today!

- PRM -

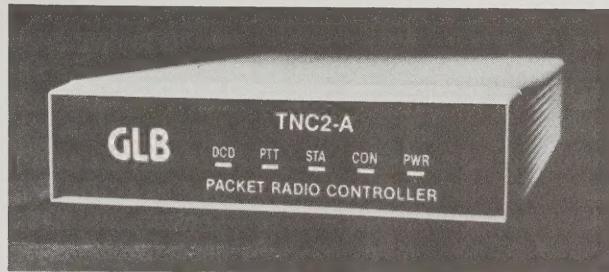
# GLB TNC2A PACKET CONTROLLER

GLB Electronics - the first commercial producer of packet controllers joins the "TAPR Revolution" to bring you the GLB Model TNC2A Kit. This kit is the latest TAPR design and is supplied with top quality components. The GLB TNC2A is backed by over 14 years of experience in amateur radio kit products and our technical staff is available to assist you daily from 1 to 3 PM Eastern time.

## GLB Model TNC-2A Kit

### FEATURES

- AX.25 Version 2.0 Software
- Terminal baud rates - 300, 1200, 2400, 4800, 9600
- Multiple connects - up to 10 stations
- Date/time stamping
- Standard DB25 for RS232 connection
- Simple radio hookup
- Radio modem w/built-in counter for calibration
- Low power CMOS option
- Tuning indicator socket for HF & satellite work
- Modem disconnect for future options
- Lithium battery backup for RAM



Hardware  
Software  
Documentation

} by TAPR

### SPECIFICATIONS

<b>CPU</b>	- Z80A microprocessor
<b>Clock</b>	- 2.4576 Mhz standard, 4.9152 Mhz available
<b>Memory</b>	- 32K EPROM, 16K RAM standard
<b>HDLC</b>	- Packets are controlled by hardware for maximum performance permitting full duplex operation
<b>Modem</b>	- 1200 baud, Bell 202 compatible (standard) easily configured for 300 baud/200 Hz shift for HF use
<b>Serial</b>	- Computer/Terminal port is industry standard RS-232-C compatible for use with most equipment
<b>Radio</b>	- Watchdog timer for channel protection transmits audio levels adjustable for nearly any radio. Wide dynamic range demodulator. Channel busy input (RF-DCD) to inhibit packet transmissions on a shared channel.
<b>LEDs</b>	- Power - tells you when power is applied Status - tells you when you have unacknowledged traffic in your buffers Connect - tells you when you are in the error-free mode DCD - tells you when your TNC2A senses other activity on the channel
<b>Power</b>	- PTT - tells you when your TNC2A keys the transmitter - +10 to +15 VDC CMOS-110 ma NMOS-260 ma Typical

Model TNC2A Kit NMOS \$154.95  
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# TOO GOOD TO BE TRUE?



PAKRATT™ Model PK-64

shown with enhanced  
HFM-64 option installed

## ★ MORSE ★ BAUDOT ★ ASCII ★ AMTOR ★ PACKET ★

### FIRST FIVE MODE DATA CONTROLLER

The Pakratt model PK-64 by AEA is the world's first computer interface that offers Morse, Baudot, ASCII, AMTOR and Packet all in one box (hardware and software included) at a price many competitors charge for Packet alone (from \$219.95 Amateur net). Do not let the low price fool you; coming from any other company but AEA it WOULD be too good to be true. The PK-64 works with virtually any voice transceiver. The Pakratt is the easiest of any to hook up and have operating in just a few minutes.

In Packet mode, the PK-64 offers virtually all the features of every other Packet controller on the market, plus many important features left out by others due to cost constraints. For example, we have included a hardware HDLC, true Data Carrier Detect (DCD), multiple connect with up to ten stations simultaneously and full implementation of version 2.0 of the AX.25 protocol.

Because the PK-64 was designed specifically for the Commodore 64 (or C-128 and SX-64) computer, we have been able to do many things not economically feasible with general RS-232 interface controllers. For ex-

ample, the Pakratt includes true split screen operation with on-screen status indicators and an on-screen tuning indicator.

### ENHANCED HFM-64 MODEM OPTION

The standard PK-64 will operate all modes with a phase-lock-loop (PLL)-detector roughly equivalent to all popular packet modems in the marketplace (except we have included extra filtering). The enhanced HFM-64 modem option offers true independent dual channel filtering with A.M. detection (like the famous CP-100 Computer Patch™). The enhanced HFM-64 option also offers a hardware LED tuning indicator (like the CP-100) and a front panel variable threshold control for setting maximum sensitivity under various band conditions. We recommend the HFM-64 option for anyone keenly interested in weak-signal heavy-QRM HF operation. For anyone desiring to operate FM RTTY with the standard North American tone pair or CW receive, the HFM-64 is required. The HFM-64 is field installable with no soldering or test equipment required.

### WORKS WITH THE POPULAR C-64 COMPUTER

AEA designed the PK-64 around the

low-cost C-64 because of the special architecture features making it especially suited to Amateur Radio applications. The C-64 should not be viewed as a mainframe, but rather a very economical accessory to your data communications system. Many owners of expensive computers such as IBM, TANDY, APPLE, KAYPRO, ATARI, etc., are now buying the low cost C-64 and dedicating it to their operating position. They simply cannot find software for their machine that even approaches the power and user friendliness of the PK-64. Plus, think of the convenience of having only one controller and keyboard to go from one mode to another without having to redo cabling!

The PK-64 is so complete that all you need to do is wire up a microphone connector to the end of a cable (provided) and you are ready to go. There is no need to track down special terminal software, cabling or even a power supply. It all comes with the PK-64. So do not be the last on your block to own the most exciting new product in years. See the PK-64 at your favorite dealer or write for our specification sheet now.

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